

## METHOD AND APPARATUS FOR CLEANING TIRE RIMS

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to cleaning brushes and more particularly to methods and apparatus for cleaning tire rims on a motor vehicle, such as a truck.

[0002] Many motor vehicle owners take pride in keeping their motor vehicles as clean as possible, whether it be vacuuming the interior carpet of their motor vehicle or polishing the chrome bumpers meticulously. Many owners customize the detailing of their motor vehicle to fit their own requirements and needs.

[0003] Many motor vehicle enthusiasts are proud to display a clean, shiny tire rim. Unfortunately, tire rims are close to the road and, therefore, accumulate a lot of dirt and grime. Tire rims, therefore, need constant attention in order to achieve the desired polished effect.

[0004] A number of techniques have been developed by enthusiasts for keeping their tire rims in good condition. Some wrap a towel around their fingers to get into small grooves; others apply water pressure to remove embedded dirt from the rims. Another practice for cleaning tire rims may be using a hand brush or cloth in conjunction with a cleansing agent. The brushes, however, have been generally designed with the goal of detailing and cleaning a small part of the tire rim at one time.

[0005] Using a brush that is not particularly designed to clean tire rims is painstakingly detail-oriented, time consuming and not very effective. Although these deficiencies affect all motor vehicle owners, the shortcomings of existing brushes are particularly glaring when cleaning large tire rims such as those found on trucks and larger vehicles.

[0006] Thus, there is a need for a simple and quick method and apparatus for cleaning tire rims, particularly truck tire rims.

## SUMMARY OF THE INVENTION

[0007] The present invention provides methods and apparatus for cleaning the tire rims on trucks. It also provides methods and apparatus for cleaning the tire rims in a fleet of trucks.

[0008] The method, in accordance with one aspect of the present invention, involves connecting a brush having a plurality of bristles extending from the brush to a power tool capable of rotating the brush. Thus, the brush is inserted into a first tire rim of a first truck such that the bristles on the brush are in contact with the surfaces of the first tire rim. Then, the power tool is turned on so it rotates, thereby causing the brush to rotate and cleaning the first tire rim. Next, these steps are repeated on the remaining tire rims of the first truck, and then the steps are repeated on the remaining trucks in the fleet. The entire fleet is thereby cleaned. In accordance with a further aspect of the present invention, a cleaning agent can be used.

[0009] In accordance with another aspect of the present invention, a power tool is provided for use with the brush. The brush includes a shaft having a first end that can be engaged with the power tool. The shaft preferable has a length between 14 to 20 inches. The brush further includes a plurality of bristles that are connected to and extend outward from the shaft. The bristles preferably have a length extending from the shaft in a range of 3.5 to 6 inches. Further, the bristles are preferably made from nylon, such as Nylon 612.

[0010] The shaft is preferably comprised of at least two strands of intertwined stainless steel. The shaft preferably has a diameter of 3/8 inch. Preferably, the shaft has one or more loops at one end, the loops having bristles extending outwardly in a direction away from the end of said shaft. The bristles are generally more dense in the looped area.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIGS. 1 and 2 illustrate a tire cleaning brush in accordance with a first embodiment of the present invention;

[0012] FIG. 3 illustrates a tire rim being cleaned by the brush of FIG. 1;

[0013] FIG. 4a illustrates a tire cleaning brush in accordance with an alternate embodiment of the present invention;

[0014] FIG. 4b illustrates a side view of the embodiment shown in FIG. 4a;

[0015] FIG. 4c illustrates an alternate embodiment of the present invention;

[0016] FIG. 5 illustrates a tire cleaning brush in accordance with another embodiment of the present invention;

[0017] FIG. 6 illustrates a tire cleaning brush in accordance with a further embodiment of the present invention; and

[0018] FIG. 7 illustrates one embodiment of the present invention attached to a power tool; and

[0019] FIGS. 8 and 9 illustrate a preferred method of manufacturing the brush of the present invention.

#### DETAILED DESCRIPTION

[0020] The present invention is a new and improved brush assembly and a method of using the same. Additionally, the present invention contemplates a method of cleaning the tire rims on a fleet of vehicles, including a fleet of trucks.

[0021] A brush 10 is shown in FIG. 1. The brush 10 includes a shaft 12. The shaft 12 has a first end 14 and a second end 16. The shaft 12 of FIG. 1 may be manufactured with many different materials and may come in many dimensions. When used to clean truck tires, the shaft 12 is preferably long enough to extend into a deep tire rim. In this case, in a preferred embodiment, the shaft 12 is constructed from 3/8-inch stainless steel and the length of the shaft 12 is in the range of from 14 to 20 inches. More preferably, the shaft 12 is approximately 16 to 18 inches long. In a most

preferred embodiment, the shaft 12 is 18 inches long. The shaft 12 may also be comprised of other materials such as plastic, aluminum, or the like, however, steel is preferred.

[0022] The first end 14 of the brush 10 may optimally include an end piece 18. The end piece 18 is designed and constructed for engaging and cooperating with a power tool capable of rotating the shaft 12. The power tool may be a standard portable electric drill provided with an electric cord for attaching the drill to a power source, or the drill can be provided with a suitable internal battery that provides a source of power. There are many acceptable power tools available today.

[0023] The end piece 18 may be integrally formed with shaft 12. Alternatively, the end piece 18 and the shaft 12 may consist of two separate elements interconnected to one another. In accordance with a preferred embodiment of the brush 10, the brush 10 does not include an end piece 18, thus leaving first end 14 of the shaft 12 free.

[0024] A plurality of bristles 20 are located near the second end 16 of the shaft 12, as illustrated in FIG. 1. The bristles 20 may extend from the second end 16 to a point having a distance of between 7 to 12 inches from the second end 16 along the shaft 12. In a preferred embodiment, the bristles 20 extend down the length of the shaft 12 from the second end 16 for approximately 9 to 11 inches. In a most preferred embodiment, the bristles 20 extend 9 inches down the length of the shaft 12 from the second end 16. Additionally, the bristles 20 do not have to extend entirely to second end 16, but preferably do so. In the embodiment shown in FIG. 1, each bristle 20 extends radially outward from the shaft 12.

[0025] The bristles 20 may be comprised of a nylon material and have a length extending from the shaft 12 in a range of 3.5 to 6 inches. In a more preferred embodiment, the bristles 20 extend from the shaft 12 for a length in the range of 4 to 5 inches. In a most preferred embodiment, the bristles 20

extend cylindrically from the shaft 12 for a length of about 4.5 inches.

[0026] Other materials may be used for the bristles 20, such as cloth, polypropylene or the like. A combination of nylon and cloth can also be used for the bristles 20. However, in the preferred embodiment, the bristles 20 are constructed from nylon, specifically nylon 612. Nylon is the preferred material for the bristles due to its high resiliency. If cloth is used the cloth is preferably glued to the nylon bristles. The cloth 25 can be a felt material that is wrapped around a bristle and secured thereto with glue as shown in Fig. 2.

[0027] Additionally, it has been found that the nylon, specifically nylon 612, when treated to a warm or hot water bath, readily returns to its original shape. Thus, if the brush 10 has been left under a heavy load and the bristles 20 have lost their shape, a hot bath will realign the bristles 20 back to their original form.

[0028] It is preferred that the bristles 20 be crimped. The crimping of the bristles allows the density of the bristles 20 in the brush 10 to be increased. This feature enables more bristles to be placed at a location, as compared to bristles that are not crimped. The brush 10 may be designed having a greater density of bristles 20 at certain locations along shaft 12. For example, brush 10 may have a higher density of bristles located in proximity to second end 16 compared to locations along the shaft 12 closer to first end 14.

[0029] The bristles 20 preferably extend completely around the shaft 12, forming a circular body as viewed from the top and as shown in FIG. 2. In a preferred embodiment, a 1/4-pound of nylon 612 is used in construction of the brush 10.

[0030] As illustrated in FIG. 2, the brush 10 generally has a circular appearance when looking down at second end 16 of the brush 10. Also, as can be seen in FIGS. 1 and 2, in accordance with a preferred embodiment of the present

invention, a protection element 24 may be attached to second end 16. The protection element 24 is designed to protect a tire rim from being scratched by a part of shaft 12 specifically, the second end 16, which may extend past bristles 20. The protection element 24 may consist of a plastic or rubber coating that is dipped, painted or sprayed onto the end of the shaft 12. Additionally, the protection element 24 may be molded plastic, cork, rubber or the like fastened to the shaft 12, preferably by glue and/or a pressure fit. In a preferred embodiment, the brush 10 has sufficient bristles extending from the top of the brush 10 such that scratching should not be a concern.

[0031] As illustrated in FIG. 3, the brush 10 is designed and dimensioned to fit between a hub 30 and an exterior wall 32 of a tire 34. The exterior wall 32, the hub 30 and an interior wall 38 define cavity 36 of a tire rim. The brush 10 is preferably sized to fit into the cavity 36. Further, the brush 10 preferably contacts all surfaces of the tire rim simultaneously. Thus, the brush 10 is preferably equal to the width and depth created by the cavity 36 of the tire rim, or may be somewhat bigger than the width and depth of the cavity. The tire 34 may be any tire used in conjunction with vehicles.

[0032] Since the brush 10 has been designed specifically for cleaning tire rims, the brush easily contacts with hub 30 (an interior cylindrical surface) and exterior wall 32 (an exterior cylindrical surface) simultaneously when second end 16 of brush 10 is placed between the two. Additionally, the brush 10 may conveniently contact the interior wall 38 of the tire 34 at the same time it contacts the other surfaces of the tire rim.

[0033] The brush 10 may also be used to clean other parts of a tire such as the tire 34 itself and front surfaces of the tire hub. In order to best clean these surface the brush 10 may be angled parallel to the tire. The brush also may be moved laterally back and forth as well as up and down across all parts of the tire. This is in contrast to the rotating in

and out movement utilized when cleaning the cavity 36 as described above. It is also possible to adjust the angle of contact between the tire 34 and the brush 10 to achieve whatever angle is most advantageous to remove dirt and grime from various places disposed on the tire.

[0034] To operate the brush 10, a user attaches the first end 14 of brush 10 to a power tool capable of rotating shaft 12. The user places the second end 16 of the brush 10 into the cavity 36 between the hub 30 and the exterior wall 32 of the tire 34. The protection element 24 protects the interior wall 38 from being scratched by the shaft 12. The user then activates the power tool, thereby rotating the brush 10. The bristles 20, now also rotating about the shaft 12 due to the power tool, come into contact with the exterior wall 32, interior wall 38 and the hub 30. Friction caused by the rotation of the bristles 20 against each of the walls causes any dirt disposed on the walls to become displaced and disengaged. The user may rotate the brush 10 about the entire circumference of the tire rim, thereby cleaning the entire surface of the exterior cylindrical wall 32, interior wall 38 and the hub 30. After multiple revolutions around the circumference of the hub 30 by the user, most of the dirt disposed within the cavity 36 will be removed. Additional rotations may be added to the cleaning process as needed. Because all of the tire rim surfaces are simultaneously contacted, cleaning is improved.

[0035] In a further embodiment of the present invention, a cleaning agent may be provided before, during or after employment of the brush 10 to aid in the cleaning process of the tire 34. Preferred cleaning agents include water, soap or the like. Additionally, the brush 10 may be used in conjunction with a polishing agent if the user so desires.

[0036] In alternate embodiments of the present invention as shown in FIGS. 4a, 4b and 4c, a brush 100 is similarly constructed to the brush 10. The brush 100 has a shaft 112 and a second end 116. The shaft 112, however, has a loop 117

disposed at the second end 116. The loop 117 is preferably formed by the intertwining two strands of stainless steel comprising the shaft 112, and then bending the end of the shaft 112 back against itself in a turn and tuft technique known in the art. In either embodiment shown in FIGS. 4a and 4c, loop 117 is designed to create a location in which a plurality of bristles 120 are retained such that they extend outwardly from the shaft 112 in direction that is perpendicular to the shaft 112 and in directions that extend along the shaft 112 past second end 116 of the shaft 112. Thus, in FIGS. 4a and 4b, the bristles 120 not only form a cylinder about the shaft 112, but a fan top 119 of bristles is also disposed at the second end 116 of the shaft 112. It is preferred to provide a higher density of bristles in the fan top 119. It is further preferred that the bristles 120 extend from the second end 116 in as many directions as possible.

[0037] This construction of the brush helps protect the interior wall of the tire rim. This feature also provides greater contact between the brush 100 and the interior walls of the tire 34. Specifically, with reference back to FIG. 3, the fan top 119 of the brush 100 allows for greater contact between the interior wall 38 and the brush 100, while the brush 100 is located between the exterior wall 32 and the hub 30. With the increase in surface contact area between the brush 100 and the cavity 36, fewer rotations of the brush 100 about the hub 30 are required to clean or polish the tire 34.

[0038] The fan top 119 may take many shapes depending on how many bristles are added to brush 100, as well as the technique that is used to attach the bristles to the shaft. In a situation where a turn and tuft technique is utilized, the fan top 119 may be in the shape of a substantially two-dimensional semi-circle as show in FIG. 4a.

[0039] Additionally, the top may take a more rounded shape 121, where the top forms a complete semi-spherical covering. In this embodiment, as shown in FIG. 4c, a stopper such as wedge 130 may be provided along shaft 112 to urge the bristles



120 transversely past second end 116. Additionally, methods of providing such a feature may also include providing a top element 126 which attaches to second end 116 and includes bristles extending away from brush 100. Wire ties, cork, plastic caps and other methods may be employed to add or manipulate bristles at the second end 116.

[0040] In yet another alternate embodiment of the present invention as shown in FIG. 5, the brush 200 is similarly designed to brush 10 of FIG. 1. However, the brush 200 also has a handle 221 disposed at a first end 214. The handle 221 replaces the locking hub or free end provided with the first two embodiments of the present invention. The brush 200 is not designed to work in conjunction with a power tool; instead, the brush 200 is designed to be manually rotated about a cavity of a tire by a user.

[0041] The handle 221 is preferably dimensioned to fit comfortably in a user's hand, thus enabling the user to maneuver brush 200 about a cavity of a tire. The bristles 220 are preferably dimensioned similarly to the bristles 20, the dimensions having previously been described. In a preferred embodiment, the bristles 220 have a length of between 4 to 5 inches extending from the shaft 212.

[0042] The handle 221 may include a gripping portion, which increases the comfort of the user when handling the brush 200. The gripping portion may be designed with ridges sized for receiving a user's fingers. The handle 221 may be integrally formed with shaft 212; or in an alternate embodiment, the handle 221 may be a separate piece interconnected to the shaft 212 of the brush 200. Where a handle 221 is provided, the shaft 212 preferably has a length of 16 to 23 inches, to allow the brush 20 to be fully inserted into the tire rim.

[0043] In yet another alternate embodiment of the present invention as shown in FIG. 6, a brush 300 may include a loop 317 disposed at second end 316 of a shaft 312. As previously referenced with regard to FIGS. 4a, 4b and 4c the loop 317 is provided with the brush 300 in order to fill or attach

additional bristles 320 along shaft 312. Similar to the bristles 120 of the brush 100, the bristles 320 of the brush 300 form a fan or semispherical shape or some other similar shape at the tip of shaft 312. As contrasted with brush 200 of FIG. 5, the brush 300 of FIG. 6 provides additional contact points between the brush and a tire. However, similar to the brush 200, the brush 300 includes a handle 321, as opposed to a locking hub or free end used with the first two embodiments of the present invention. Once again, the handle 321 may be integrally formed with the shaft 312, as wherein the handle 321 is a continuation of the shaft 312 intertwined to be used as a handle for a user. Additionally, as with the embodiment shown in FIG. 5, the handle 321 may be a separate element and provided with various features, which increase the comfortability of a user while employing the brush.

[0044] It should also be appreciated that each embodiment of the brush of the present invention can use the fan-shaped bristles at the end of the shaft or any other feature disclosed herein.

[0045] Although the brush of the present invention may be utilized by any motor vehicle owner or employee to clean tire rims, the advantages of the present invention are magnified when used by businesses that have fleets of vehicles that require cleaning tire rims on multiple motor vehicles. The present invention is particularly advantageous when the fleet of vehicles consists of trucks. Examples of such businesses are UPS, service stations, towing companies, construction companies, landscaping businesses, truck cleaning companies, the U.S. Postal Service, trucking companies and the like. Although these businesses' prime objective may not be to clean motor vehicles, maintaining a clean vehicle is still important. The use of the present invention by such businesses will save time, improve efficiency and ultimately save money. Further, the fleet can easily be cleaned with a brush in accordance with the present invention on the weekend or on a day when the trucks are idle.

[0046] In accordance with a preferred embodiment of a method of the present invention, the tire rims on a fleet of trucks are cleaned by first connecting a brush having a plurality of bristles extending from the brush to a power tool capable of rotating the brush. Then, the brush is inserted into a first tire rim of a first truck so that the bristles on the brush are simultaneously in contact with an exterior and interior surface of the tire rim. Further, the brush, in accordance with the preferred embodiment of the present invention, also contacts an inner surface of the truck tire rim. A cleaning agent can also be applied to each tire rim before inserting the brush into the first tire rim.

[0047] After the brush has been inserted into the first tire rim, a power tool is activated so as to rotate the brush. In this manner, the first tire rim is cleaned as the brush is rotated around the circumference of the tire rim. Then, the brush is inserted into the next tire rim and the power tool is caused to rotate in the same manner as previously described so that the brush also rotates, thereby cleaning the next tire rim. Each remaining tire rim is cleaned in this fashion. Then, each of these steps is repeated for each of the remaining vehicles in the fleet.

[0048] A timetable may be set up wherein each truck must report at a scheduled time, so that trucks are serviced and cleaned; or, additionally, the driver of the truck may be responsible to keep his or her individual truck clean.

[0049] The brush of the present invention provides the added advantage of not only being large enough so that, as previously described, the brush may simultaneously contact the surfaces of a tire rim including the hub 30, the exterior wall 32 and the interior wall of the tire 34 as shown in FIG. 3, but also is compact enough that the driver of the motor vehicle may keep the brush 10 in his own truck. Similarly, any garage or service station employing the brush 10 may also easily store the brush as compared to larger motorized devices.

[0050] Whether it be the individual driver or servicing personnel, the user must simply connect the brush 10 to a power tool so as to rotate the bristles 20 that are connected to the shaft 12. The shaft 12 is then placed into the cavity 36 of the tire 34, once again as shown in FIG. 3 and rotated about the circumference of the hub 30 until the tire rim is cleaned. After having completed one tire, the user simply repeats the steps on the remaining tire rims of the truck. Then, the tire rims for the remaining trucks in the fleet can be cleaned by repeating the process.

[0051] The brushes, as described herein may also be utilized by truck cleaning businesses and more specifically to mobile truck cleaning businesses that move from location to location cleaning one vehicle or a fleet of vehicles at each stop. The brush as presently disclosed would greatly aid these businesses by providing a quick, efficient and inexpensive accessory specifically designed for purposes consistent with their business's goals i.e. meticulously cleaning of a truck. Additionally, the brush of the present disclosure may be utilized in conjunction with an air or water pressure system further improving the cleaning process. Thus, the brush of the present invention is preferably carried on a truck or other vehicle as part of an operation geared towards cleaning fleets of trucks.

[0052] The brush as described herein may also be coupled with various cleaning agents, polishes and cleaning accessories in various kits. Specifically, one kit may include the brush of the present invention along with a cleaning agent. Another kit may include the brush, the cleaning agent and a power tool. Additionally, the kits as previously described may include various sponges and other brushes of varying size and shape, specifically designed for cleaning tire rims. These various kits include each of the previously mentioned components in the kit in a single package and are offered for sale in the single package. Providing the brush of the present invention in combination with other tire

and tire rim cleaning products and cleaning tools in a single package in kit form advantageously allows consumers and other cleaning businesses to conveniently buy all the products needed to clean tire rims and tires.

[0053] Furthermore, one or all of the elements included with the kits described above may also be expanded to include various other cleaning accessories. One example of additional accessories may be products designed to clean and polish other elements of the tire such as the tire itself. This includes all tire cleaning products presently available. Thus the present invention contemplates a kit including a brush described herein along with products for cleaning tire rims and additional products for cleaning tires. Although, specific combinations of a kit have been described above, it should be realized that specific examples are only illustrative and various combinations including all the elements detailed or only some of the elements detailed may be included in a specific kit along with the brush of the present invention. Additionally, other products may also be combined with the present inventive brush to form additional kits.

[0054] FIG. 7 illustrates one embodiment of the present invention being coupled to a power tool. The brush 10 may be inserted into the power tool and then locked in place with a locking mechanism located on the power tool.

[0055] FIGS. 8 & 9 illustrates a preferred method of manufacturing the brush of the present invention. Referring to FIG. 8, there are two stainless steel bars 400 and 402. A plurality of brushes 404 are placed between the bars 400 and 402. In accordance with a preferred embodiment of the present invention, there is a section 406 where the bristles 404 are of higher density. In accordance with known techniques, the bars 400 and 402 are twisted about each other, thereby securing the bristles 404 securely between the bars 400 and 402. This twisting secures the bristles 404 along the length of the bars 400 and 402.

[0056] As mentioned previously, the bristles 404 are preferably nylon, and most preferably nylon 612. The previous lengths of the bristles 404 were stated for the distance that they extend from a shaft of a brush. As can be seen from FIG. 8, the bristles 404 are in fact twice that length. Thus, in accordance with the preferred embodiment, the total length of the bristles 404 are between 7 and 12 inches and more preferably between 8 and 10 inches, with half that length extending from the shaft. In a most preferred embodiment the total length of the bristles 404 is 9 inches.

[0057] Referring now to FIG. 9, the bars 400 and 402 are illustrated in a twisted formation, as previously described. The top part 408 of the two bars is preferably folded over, as previously discussed. The area 406 is the area that is bent. Since the density of the bristles 404 is greater in the area 406, the twisting of the two bars 400 and 402 does not form as close a wrap of the two bars 400 and 402 in the area 406, and openings 410 and 412 are formed. The opening 410 and 412, as shown in FIG. 9 are further clamped to secure the bristle in the openings 410 and 412. These openings 410 and 412 have a high density of bristles 404 extending through the openings formed by these loops. The openings formed by the loops 410 and 412 are preferably angled such that the bristles extend upward away from the axis of the shaft formed by bars 400 and 402 in the direction indicated by the arrow A. In accordance with a preferred embodiment, the loops formed by the opening 410 and 412 are angled from a line running parallel to the axis of the bars 400 and 402 by an angle between 10 and 20 degrees. This arrangement allows a portion of the bristles 404 to extend upward along the line of the shaft to contact an interior wall of a tire rim.

[0058] Note that it is preferred to paint or coat the top surfaces of the loops 410 and 412 with a rubberized or otherwise soft coating. This forms a protective element, as previously discussed, to minimize the possibility of scratching.

[0059] Although the present invention herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present invention. It is therefore to be understood that numerous modifications may be made to the illustrative embodiments and that other arrangements may be devised without departing from the spirit and scope of the present invention as defined by the appended claims.

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